

Toxicity Identification and Evaluation and Long-Term Contaminant Trends in the Baltimore Harbor

Joel Baker

Chesapeake Biological Laboratory

University of Maryland Center for Environmental Science

P.O. Box 38, 1 Williams Street

Solomons, Maryland 20688-0038

baker@cbl.umces.edu

Daniel Fisher

Wye Research and Education Center

University of Maryland

P.O. Box 169

Queenstown, MD 21658

df49@umail.umd.edu

Collaborators

- Dr. Jeff Halka and Dr. Jim Hill
 - Maryland Geological Survey
- Dr. Michael Unger
 - Virginia Institute of Marine Sciences
- Dr. Jeffrey Cornwell
 - UMCES Horn Point Laboratory
- Frontier Geosciences, Inc.
- Dr. Robert Mason
 - UMCES Chesapeake Biological Laboratory

Potential Causes of Observed Sediment Toxicity in Baltimore Harbor

A weight of evidence approach, suggested that toxicity at stations in Bear Creek and Colgate Creek may have been driven by sediment-associated metals, whereas toxicity at stations in the Inner Harbor was likely due to both metal and organic contaminants.

Identification of the contaminants responsible for sediment toxicity is difficult without performing a toxicity identification evaluation. Correlative associations between toxicity and concentrations of sediment-associated contaminants demonstrate covariance, but not causality.

B.L. MCGEE, D.J. FISHER, L.T. YONKOS, G.P. ZIEGLER, and S.TURLEY, *Environmental Toxicology and Chemistry*, Vol. 18, No. 10, pp. 2151–2160, 1999

Objectives

1. To identify classes of chemical contaminants responsible for the toxicity observed in Baltimore Harbor sediments, and,
2. To estimate historical inventories of chemical contaminants in the harbor and, therefore, to determine the harbor response times to altered loadings.

Strategy

- Whole Sediment Toxicity Identification and Evaluation
 - 18 sites previously studied
 - *Leptocheirus plumulosus*
 - Selectively 'remove' toxicity from metals, organics, and ammonia.
 - First large field application of newly developed EPA methods
 - Method characterization required
- Bioaccumulation endpoint
 - Are stressors accumulating in native benthos?

Strategy

- Sediment geochronology
 - Cores from 3 locations in the harbor
 - Each sectioned into ca. 40 depth increments
 - Radiochemical dating
 - Analysis for metals, TBT, PAHs, PCBs
 - Used to explore behavior of Baltimore Harbor chemical contaminant models.

TIME LINE FOR COMPLETION OF TASKS

[illegible]